TOLOCHKOV, Mikhail Ivanovich; BIRYUZOVA, Ye.I, red.; ANDRIANOV, B.I., tekhn.red.

[Camouflage in war] Maskirovka na voine. Moskva, Izd-vo DOSAAF, 1958. 52 p. (MIRA 12:9)
(Camouflage (Military science))

TOLOCHKOV, M.I.

How the danger of shield bugs was eliminated. Zashch.rast.ot vred. i bol. 4 no.1:31-32 Ja-F '59. (MIRA 12:2)

1. Agronom-entomolog Atkarskogo uchastka Saratovskogo otryada. (Shield bugs)

TOLOCHKO, M.M.

How we achieve high-quality repair of machines. Mekh. sil'. hosp. 13 no.9:7-8 S '62. (MIRA 17:3)

1. Upravlyayushchiy Kupyanskim rayonnym otdeleniyem "Sil'gosptekhniki", Khar'kovskoy oblasti.

1. AFANAS'YEV, A. A., Docent : TOLOCHKO, V. I. Eng.

2. USSR (600)

4. Caprone

7. Use of caprone thread for sewing leather goods and footwear. Leg. prom. 12 no. 10, 1952

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

TOLOCHKO, V.I., inzh.

Theory of the cutting of materials used in shoe manufacture.
Izv. vys.ucheb. zav.; tekh.leg. prom. no.2:67-76 '58. (MIRA 11:6)

1.Kiyevskiy tekhnologicheskiy institut legkoy promyshlennosti.
(Shoe manufacture)

TOLOCHKO, V.I., Cand Tech Sci — (diss) "Study of the cutting ~~process~~ of tough hide materials and their substitutes." Mos, 1958, 17 pp (Min of Higher Education USSR. Mos, Tech Inst of Light Industry) 150 copies (KL, 35-59, 115)

AFANAS'YEV, A.A.: TOLOCHKO, V.I.

Boots and Shoes

Reduction of waste in making the lower parts of footwear, Leg. prom., No. 1, 1952.

Monthly List of Russian Accessions, Library of Congress, March 1952. UNCLASSIFIED.

TOLOCHKOV, M., polkovnik; KUZ'MENKO, N., general-mayor tankovykh voysk; DVORTSOV, F., podpolkovnik; KOVALEV, F., podpolkovnik; KOLESNIKOV, I., gvardii general-mayor; ROMANOV, M., polkovnik; KALINOVSKIY, V., polkovnik; BOZHKO, I., podpolkovnik; PAVLOVICH, A., podpolkovnik

We discuss projects of new general Army regulations. Voen. vest. 38 no. 8:2-10 Ag '58. (MIRA 11:7)
(Russia--Army--Regulations)

TOLOCHKOV, M. (Atkarsk, Saratovskoy oblasti).

Forgotten trade-union organizations. Sov. profsoiuzy 6 no.3:77 Mr '58. (MIRA 11:3)

1. Predsedatel' Atkarskogo grupkoma profsoyuza rabochikh i sluzhashchikh sel'skogo khozyaystva i zagotovok.
(Atkarsk--Trade unions)

LOBCHIKOV, M. G., agronom; TOLOCHKOV, M. I., agronom

Responses to our articles. Zashch. rast. ot vred. i bol. 5 no.11:18-19 N '60. (MIRA 16:1)

1. Bulayevskiy trest sovkhozov, Severo-Kazakhstanskaya obl. (for Lobchikov). 2. Saratovskiy otryad po bor'be s vreditelyami i boleznyami rasteniy, Atkarsk (for Tolochkov).

(Plants, Protection of)

TOLOCHKOV, Yu.A.

Variation of cutting forces due to the wear of cutting tools. Stan.i
31 no.10:22-24 O '60. (MIRA 13:10)
(Metal cutting)

TOLOCHKOV, Yu.A.

Automatic control in machining based on indirect measurement methods. Priborostroenie no.9:8-11 S '62. (MIRA 15:9)
(Metal cutting) (Automatic control)

S/121/60/000/010/007/015
A004/A001

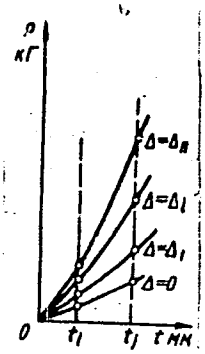
AUTHOR: Tolochkov, Yu. A.

TITLE: Tool Wear Causes Change in Cutting Forces

PERIODICAL: Stanki i Instrument, 1960, No. 10, pp. 22-24

TEXT: The author presents investigation results obtained by the MAI and VNII, based on which a method was developed making it possible to solve with sufficient simplicity the problems connected with the effects of tool wear on the dynamics of the machining process. It is expedient to carry out the investigation of such problems by way of analyzing the family of curves described by the equations $P = f(t)\begin{matrix}G\\S\\\Delta\end{matrix}$, G being the quantities characterizing the geometry of the sharp tool, k = quantity characterizing the mechanical properties of the material to be machined, Δ = tool wear. These equations are plotted in the coordinate system Pt for different values of the enumerated parameters. The method of plotting a diagram Pt for single-

Figure 1:

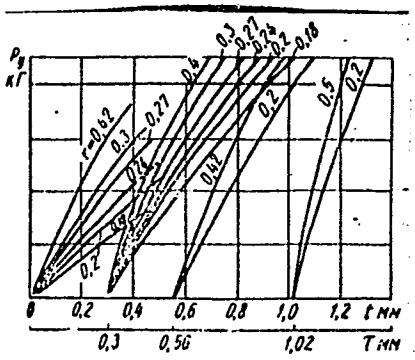


Card 1/4

Tool Wear Causes Change in Cutting Forces

operation machining can be seen in Fig. 1. In this case the parameters C, k, v, s, remain constant, while parameter Δ varies discretely. The diagram Pt for multi-operation machining by profiling tools (Fig. 2) gets somewhat complicated on account of the effect of the thickness τ of the material layer (already removed during the preceding operation) on the shape of the chip cross-section and, consequently, on the nature of the functions. By drawing through the points t_i and t_j (Fig. 1) lines parallel to the axis OP, it is easy to obtain the functions $P_{xyz} = \psi_1(\Delta)$ and $P_{xyz} = \psi_2(\Delta)$ for the constant G, k, v, s and t being equal respectively to t_i and t_j. These functions are necessary for the calculation of the elements of the SPID system concerning strength and rigidity, and for the determination of the extreme magnitudes of tool wear. Fig. 4 shows the installation layout used for taking the diagram Pt: 1 - blank, 2 - toolpost pickup of cutting stress, 3 - induction displacement pickup, 4 precision ruler, 5 - longitudinal feed slides, 6 - transverse feed slides, 7 and 8 - electron amplifier,

Figure 2:

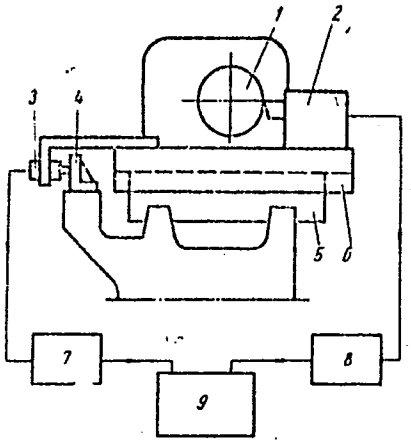


Card 2/4

Tool Wear Causes Change in Cutting Forces

9 - oscillograph. The recording of the changes in cutting force were effected with the aid of a special low-inertia equipment, composed of a low-inertia three-component pickup, three-channel high-stable electron amplifier and loop oscillograph. A well-adjusted equipment makes it possible to take the Pt diagram without difficulty and within a relatively short time. In comparison with the method of plotting the graphs by points, used formerly, the method described by the author results in a considerable saving of time, since with this method it is possible to determine the Pt diagram 10 times faster. Fig. 5 presents Pt diagrams for threading and turning operations.

Figure 4:

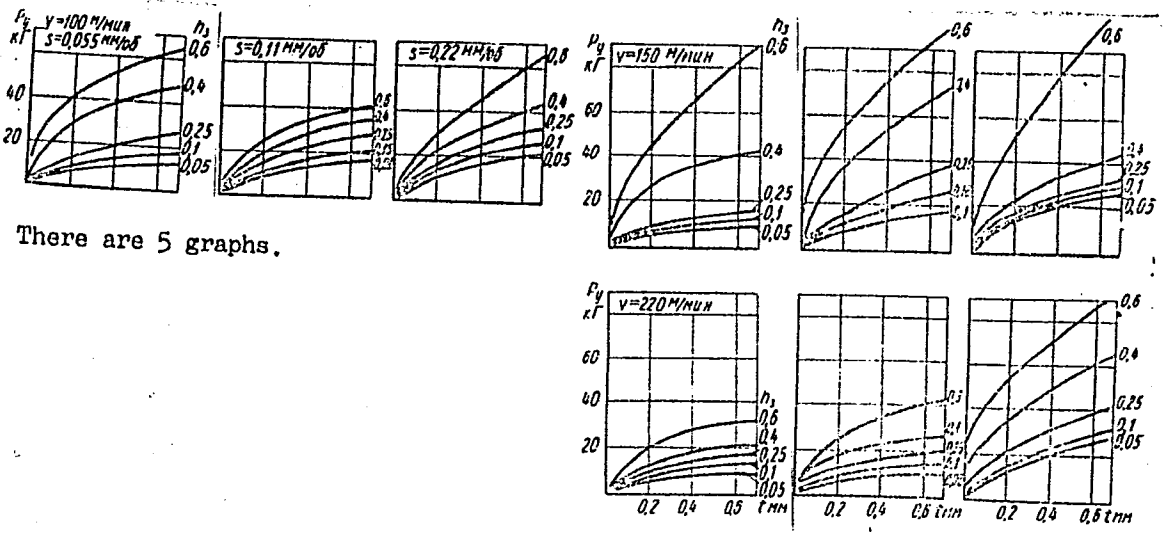


Card 3/4

Tool Wear Causes Change in Cutting Forces

S/121/60/000/010/007/015
A004/A001

Figure 5:



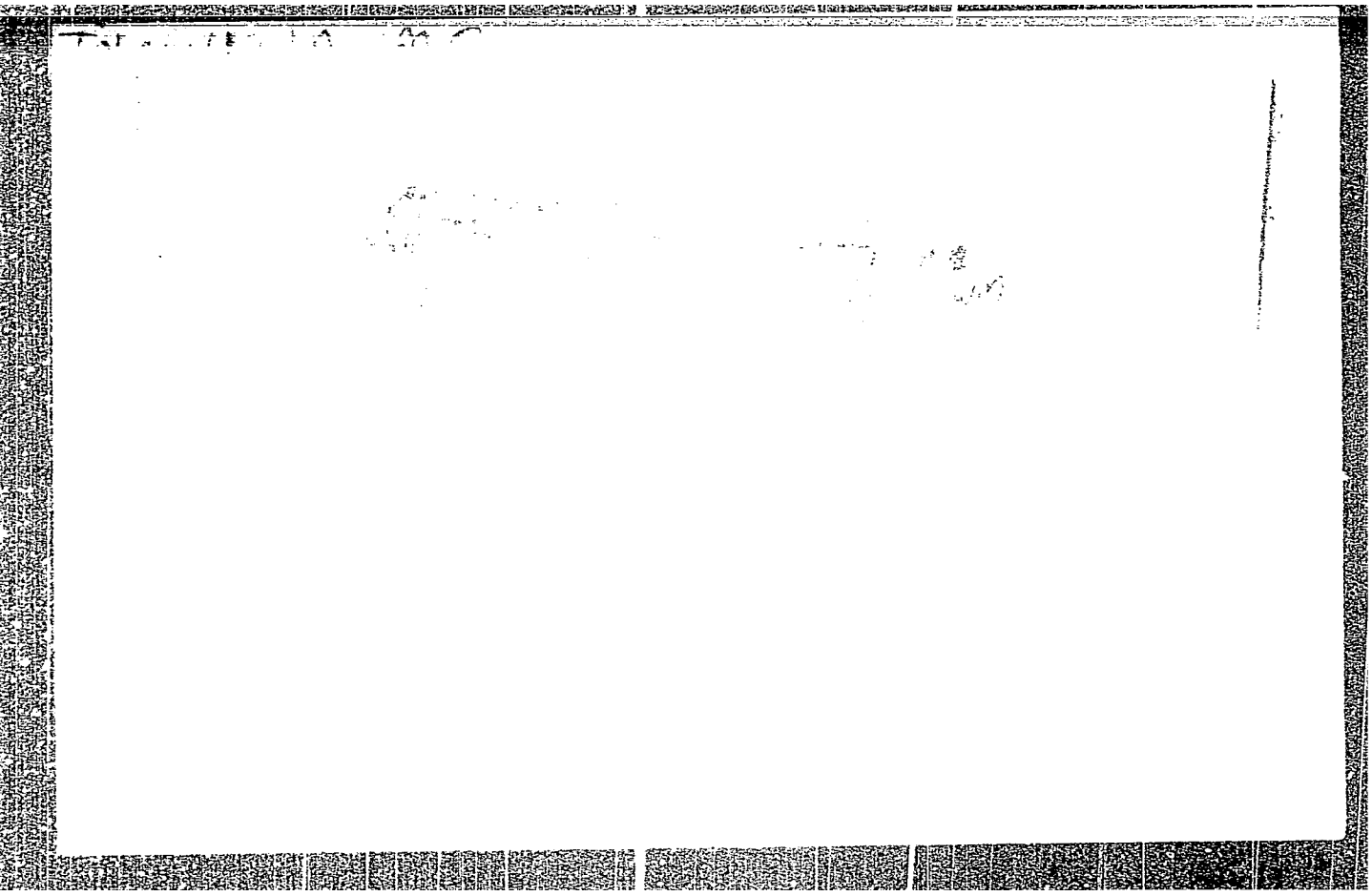
There are 5 graphs.

Card 4/4

GERSHMAN, M. I., kand. tekhn. nauk; TOLOCHKOVA, M. G., kand. tekhn. nauk

Using "white sludge" as binder in making cement. Trudy NIITSement no. 14:89-100 '60. (MIRA 13:11)
(Industrial wastes) (Cement)

TOLOCHKOVA, M. G.: Master Tech Sci (diss) -- "A study of the processes occurring in the sulfate corrosion of Portland cement". Moscow, 1958. 23 pp (Acad Construction and Architecture USSR, Sci Res Inst of Concrete and Reinforced Concrete NIIZhB), 150 copies (KL, No 3, 1959, 110)



APPROVED FOR RELEASE: 07/16/2001 CIA-RDP86-00513R001756110017-2"

Толочкова, М.Г.

BUTT, Yu.M., professor; LOGGINOV, G.I., kandidat tekhnicheskikh nauk; KHUSAINOVA, O.M., inzhener; TOLOCHKOVA, M.G., inzhener.

Use of radioactive isotopes for studying cements. TSement 22 no.6:19-21 N-D '56. (MLRA 10:2)
(Cement) (Radioisotopes--Industrial applications)

BANIT, F., inzhener; TOLOCHKOVA, M., inzhener; TULYAKOVA, V., inzhener.

Use of radioactive isotopes for investigating clinker kilning and milling processes. Stroi.mat. 3 no.3:32 Mr '57. (MLRA 10:4)
(Radioisotopes--Industrial application) (Kilns, Rotary)
(Brickmaking)

KOROLEVA, O.Ye., inzh.; TOLOCHKOVA, M.G., kand.tekhn.nauk

Obtaining building articles from mortar blends by dynamothermic action. Stroi.mat. 7 no.6:35-37 Je '61. (MIRA 14:7)
(Concrete)

TOLOCZKO, M.

Evaluation of the influence of noise caused by a heterodyne on the sensitivity of a receiver system in the 3 cm band. Przem inst telekom prace 13:no.41:55-59 '63.

1. Warszawskie Zaklady Radiowe T-1, Warszawa.

P/507/62/012/037/002/004
D271/D308

AUTHOR: Tołoczko, M.

TITLE: Symmetry criteria for microwave balanced mixers

SOURCE: Warsaw. Przemysłowy Instytut Telekomunikacji. Prace. v. 12, no. 37, 1962, 23-27

TEXT: Balance criteria are derived for a mixer - IF amplifier input system taking into account the asymmetry introduced by the hybrid junction and by the IF input circuit. In a balanced mixer signal and local oscillator voltages are supplied to mutually decoupled arms of the hybrid junction and two mixer diodes supply together the input to the IF amplifier, while a degree of compensation is obtained for noise originating in the local oscillator. The reduction of the noise level (K) depends on the diode parameters and on the balance of the junction and of the IF input circuit. Analysis of the equivalent circuit leads to the following expression for K:

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Symmetry criteria ...

$$K_{[dB]} = 20 \lg \left[\frac{1 + \sqrt{\frac{L_2}{L_1}} \cdot p \cdot r \cdot n}{1 - \sqrt{\frac{L_2}{L_1}} \cdot p \cdot r \cdot n} \right] \qquad (13)$$

where L_1 and L_2 are conversion losses of the diodes, including their mismatch, p - asymmetry factor of the IF input circuit, n - asymmetry factor of the junction, r - mismatch coefficient of the diodes at the intermediate frequency. The methods for measuring the symmetry of balanced mixers, expressed in the value of the K parameter, are reviewed, and the use of CW generator is found preferable to the noise generator. The block diagram of the measuring set-up is shown and some results obtained with a 3 cm mixer and a short gap T-junction are tabulated. The described method is particularly useful when production diodes are used at random without selecting matched pairs. The results have shown that diode parameters are the main source of unbalance, if only the junction and if the IF input

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P/507/62/012/037/002/004
D271/D308

Symmetry criteria ...

circuit are properly designed. There are 3 figures and 1 table.

SUBMITTED: January 10, 1962

Card 3/3

TOLOCZKO, Marian, mgr inz.

Relaxation circuits with tunnel diodes. Przegl telekom 35 [i.e. 36] no.3:81-85 Mr '63.

1. Warszawskie Zaklady Radiowe T-1, Warszawa.

KARPINSKI, Jacek, mgr inz.; TOLOCZKO, Marian, mgr inz.

Logical circuits with tunnel diodes. Przegl telekom 35 [i.e.36] no.4:114-119, 3 of cover Ap '63.

1. Instytut Podstawowych Problemow Techniki, Polska Akademia Nauk, Warszawa.

S/058/63/000/003/091/104
A059/A101

AUTHOR: Toloczko, M.

TITLE: Symmetry conditions of balanced microwave mixers

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1963, 28 - 29, abstract 3Zh172 ("Prace Przemysk. inst. telekomun.", 1952, v. 12, no. 37, 23 - 28, Polish; summaries in Russian, English and French)

TEXT: The equivalent scheme of a balanced mixer is considered, and a formula for the coefficient K of noise suppression of the heterodyne is obtained. K is usually expressed by means of the transformation losses and the impedance of the intermediate-frequency diodes. In deriving the formula, these and also other factors influencing K were taken into account: the asymmetry of the hybrid junction and of the intermediate-frequency input. It is assumed that the reactive conductance of the intermediate-frequency amplifier input is compensated for, and the mismatch and the final output of the hybrid junction are not taken into consideration. Methods of measuring K and the coefficients characterizing the balanced-mixer symmetry are described. The experimental results obtained in a 3 cm band are given.
[Abstracter's note: Complete translation]

V. Klimashevskiy

Card 1/1

TOLOCZKO, M.

Symmetry conditions of balanced microwave mixers. Przem inst telekom prace 12 no.37:23-28 '62.

L 39901-66

ACC NR: AT6018334 SOURCE CODE: PO/2507/65/015/49-/0067/0079 50 BH

AUTHOR: ~~Toloczko, M.~~ Tolochko, M.

ORG: Warsaw Radio Plant T-1 (Warszawskie zaklady radiowe-T-1)

TITLE: Selective transmitting and receiving switch in a balancing network

SOURCE: Warsaw. Przemyslowy Instytut Telekomunikacji. Prace, v. 15, no. 49/50, 1965, 67-79

TOPIC TAGS: antenna, amplitude modulation, magnetron, gas discharge, transmitter switch, receiver switch, ~~changeover switch~~, ANTENNA SWITCHING

ABSTRACT: Characteristics of a balanced antenna changeover switch are described; it consists of two hybrid junctions connected by selective and adjustable gas-discharge arresters. The effect of the parameter differences of dischargers and hybrid junctions on the resultant properties of the system has been evaluated. The conclusions are illustrated by measurements in the 3-cm band. It has been shown that the phase asymmetry is a major factor in balancing the switch, losses, and separation of the receiver during the transmission period. For practical

Card 1/2 UDC: 621.396.967

L 39901-66

ACC NR: AT6018334

purposes, the amplitude asymmetry is determined from the parameters of the hybrid junctions. The phase asymmetry governs the image frequency matching and changes in crosstalk attenuation by the full argument cycle Γ_m (of a cold magnetron). Crosstalk attenuation depends mainly on amplitude asymmetry with the arrester introducing higher losses, having the decisive effect. The changes in matching to the antenna, which are caused by the $\hat{\Gamma}_m$ phase, depend on the coefficients of reflection of the arresters. The use of gas-discharge arresters in a balanced antenna switch permits selectivity during the receiving period (the selectivity is determined by the parameters of the arrester) and a supplemented separation of receiver to almost 20 db. The tuning of the switch to maximum separation makes mixer protection better by another 10 db without any too adverse an effect on the parameters of the receiving period. Orig. art. has: 13 figures, 34 formulas, and 6 tables. [Based on author's abstract] [NT]

SUB CODE: 17/ SUBM DATE: 25Sep64/ ORIG REF: 004/ OTH REF: 022/

Card 2/2

KARPINSKI, Jacek; TOLOCZKO, Marian

Tunnel diode as a new part of decision elements. Przegl elektroniki 4 no.1:1-16 '63.

1. Pracownia Elektronicznych Urzadzen Liczacych, Zaklad Aparatur, Instytut Podstawowych Problemow Techniki, Polska Akademia Nauk, Warszawa.

TOLODONNIKOV, M. I.

MEASUREMENTS

"Application of Radioactive Radiations in Automatic Control Devices", by Yu. V. Grushchin, L. V. Mel'tser, M. I. Tolodonnikov, and N. N. Shumilovskiy, Avtomatika i Telemekhanika, No 9, September 1957, pp. 814-840.

Extensive survey article, describing the fundamental methods and trends in the use of radioactive radiations in automatic control. The article discusses the fundamental characteristics of α, β, and γ rays, describes various radiation detectors, and various commercially used radioactive isotopes. It then proceeds to describe the automatic control of productive processes by means of radioactive radiations, such as the automatic control of thickness and weight of material, density of the medium, liquid-level regulation, gas and liquid flow regulation, automatic signalization of presence of impurity in gas, automatic control and regulation of of gas pressure, and various relay circuits employing contactless radioactive relays.

Card 1/1

TOLOK, A.A.

Formation of cracks oriented transversely to the strike of folded structures. Soob.DVFAN SSSR no.10:232-235 '59. (MIRA 13:11)

1. Dal'nevostochnyy filial Sibirskogo otdeleniya AN SSSR.
(Folds (Geology))

TOLOK, A.A.

Changes in the deformation pattern during the formation of the structure of the Nizhne-Molodezhnoye deposit. Soob.DVFAN SSSR no.10:235-237 '59. (MIRA 13:11)

1. Dal'nevostochnyy filial Sibirskogo otdeleniya AN SSSR.
(Sikhote-Alin' Range--Geology, Structural)

TOLOK, A.A.

Tin-bearing alumo-silicite a new type of tin deposit. Soob.DVFAN SSSR no. 15:9-14 '62. (MIRA 17:9)

1. Dal'nevostochnyy filial imeni Komarova Sibirskogo otdeleniya AN SSSR.

TOLOK, A.A.; ZALITSHCHAK, B.L.; MATERIKOVA, A.M.

Micaceous-carbonate metasomatite in the Maykhe Basin of the Maritime Territory. Soob. DVFAN SSSR no.19:15-20 '69. (MIRA 17:9)

1. Dal'nevostochnyy geologicheskiy institut dal'nevostochnogo filiala Sibirskogo otdeleniya AN SSSR.

TOLOK, A. A., Cand of Geol-Min Sci — (diss) "Geology, Structure, Mineralogy, and Genesis of the Oktyabr'skiy Ore Deposits," Vladivostok, 1959, 24 pp (Academy of Sciences USSR, Siberian Division, Far-Eastern Branch im V. L. Komarov) (KL, 8-60, 115)

TOLOK, A.A.; BAZHENOVA, F.V.

Loparite, a new accessory mineral of nepheline syenites in the Sikhote-Alin' Range. Zap.Vses.min.ob-va 94 no.2:217-219 '65. (MIRA 18:5)

TOLOK, A.A.

Geochemical characteristics of the Pogin Massif of nepheline syenites in the Maritime Territory. Geokhimiia no.12:1256-1260 D '64.
(MIRA 18:8)

1. Dal'nevostochnyy politekhnicheskiy institut imeni V.V.Kuybysheva, Vladivostok.

TOLOK, Aleksandr Argent'yevich; OSIPOVA, G.A., kand. geol.-mineral. nauk, otv. red.

[Tin ore deposits of the October group in the Maritime Territory]. Olovorudnye mestorozhdeniia Oktaibr'skoi gruppy v Primor'e, Moskva, Izd-vo "Nauka", 1964. 169 p. (Akademiia nauk SSSR. Dal'nevostochnyi filial, Vladivostok. Trudy. Seriia geologicheskaia, vol. 7)
(MIRA 17:7)

TOLOK, A.A.

New type of ore-bearing nepheline syenite. Dokl. AN SSSR 157 no.3:597-598 Jl '64. (MIRA 17:7)

1. Dal'nevostochnyy politekhnicheskiy institut imeni V.V. Kuybysheva. Predstavleno akademikom D.S. Korzhinskim.

VASHCHENKO, K.I., doktor tekhn.nauk, prof.; SUMTSOV, V.F., kand.tekhn.nauk; STOYANCHENKO, S.I., inzh.; KARTASHYAN, V.O., inzh.; TOLOK, G.T., inzh.

Elements of the design of suspension-type electromagnetic iron separators. Elektrotekhnika 36 no.12:36-40 D '65. (MIRA 19:1)

GOVOROV, I.N.; STUNZHAS, A.A.; MATVEYEVA, A.A.; BLAGODAREVA, N.S.; MARTINA, R.I.; TOLOK, K.P.

Forms of the transportation of beryllium in alkali mineral-forming solutions. Soob. DVFAN SSSR no.19:39-45 '63. (MIRA 17:9)

1. Dal'nevostochnyy geologicheskiy institut Dal'nevostochnogo filiala Sibirskogo otdeleniya AN SSSR.

TOLOK, P. P., Cand Biol Sci (diss) -- "The fractionation of serum proteins with salts of light and heavy metals". Tashkent, 1959. 19 pp (Min Health Uzbek SSR, Tashkent State Med Inst), 420 copies (KL, No 9, 1960, 123)

USSR/Human and Animal Physiology - Blood, Blood Chemistry. T

Abs Jour : Ref Zhur Biol., No 3, 1959, 12587

Author : Tolok, P.P.

Inst : AS Uzbek SSR

Title : Fractionization of Serum Protein with Salts of Heavy Metals

Orig Pub : UzSSR Fanlar Akad. dokladlari, Dokl. AN UzSSR, 1957, No 10, 73-75

Abstract : The donor serum was diluted 10-fold with a medinal buffer with a pH of 9.64 and precipitated with $CdSO_4$ solution. The turbidity was measured by thermophotoelectrometry. On the curve of precipitation of serum protein with 0.005 - 0.128% solutions of $CdSO_4$ there were found concentrations which precipitated fractions of serum protein: for γ-globulin 0.008%; β-globulin

Card 1/2

USSR/Human and Animal Physiology - Blood, Blood Chemistry. T

Abs Jour : Ref Zhur Biol., No 3, 1959, 12587

0.0185; α_1-globulin 0.022; α_2-globulin 0.0236; albumin 0.138. A quantitative correlation was found with the data of electrophoresis. $CdSO_4$ possessed a great advantage over other salts. The work with $CdSO_4$ at 30 degrees was simple and required considerably less time than electrophoretic analysis. -- A.D. Beloborodova

Card 2/2

VOLYNSKIY, A.S., prof.; GUDOVICH, R.A.; SUKHAREVA, Z.I.; TOLOK, P.F.

Salting-out method of isolating the serum protein properdin. Sbor.nauch.trud.TashGMI 22:319-324 '62. (MIRA 18:10)

1. Kafedra biokhimii (zav. kafedroy - prof. A.S.Volynskiy) Tashkentskogo gosudarstvennogo meditsinskogo instituta.

L 21947-66 EWT(1)/T JK

ACC NR: AP6014627 SOURCE CODE: UR/0242/65/000/008/0033/0034

AUTHOR: Khadzhiyev, K. Kh. (Professor); Aripzhanov, K. A. (Aspirant); Tolok, P. P. (Assistant)

ORG: Department of Biochemistry /headed by Prof. A. S. Volynskiy/, Tashkent Medical Institute (Kafedra biokhimii Tashkentskogo meditsinskogo instituta)

TITLE: Free sulfhydryl groups of diphtheria and tetanus antitoxins

SOURCE: Meditsinskiy zhurnal Uzbekistana, no. 8, 1965, 33-34

TOPIC TAGS: immunology, human ailment

ABSTRACT: The article contains a comparative study of the free sulfhydryl groups of non-specific horse 2-globulin and diphtheria and tetanus antitoxins. The study showed that the SH-group content of diphtheria and tetanus 2-globulins was more than twice as great as in normal 2-globulin; in pure antitoxin the SH-group content is three times greater. The author considers this difference to be associated with the immune activity of the antitoxins. Orig. art. has: 1 table. [JPRS]

SUB CODE: 06 / SUBM DATE: 17Sep64

Card 1/1 ULR

TOLOK, P.P.

Fractionation of proteins from blood serum by heavy metals. Dokl. AN Uz. SSR no.10:73-75 '57. (MIRA 11:5)

1. Tashkentskiy gosudarstvennyy meditsinskiy institut. Predstavleno akademikom AN UzSSR S.Yu. Yunusovym.
(PROTEINS) (SERUM)

S/781/62/000/000/026/036

AUTHORS: Volkov Ya. F., Pavlov Yu. S., Tolok V. K., Skibenko A. I.

TITLE: Plasma in an alternating magnetic field

SOURCE: Fizika plazmy i problemy upravlyayemogo termoyadernogo sinteza; doklady I konferentsii po fizike plazmy i probleme upravlyayemykh termoyadernykh reaktsiy. Fiz.-tekhn. inst. AN Ukr.SSR. Kiev, Izd-vo AN Ukr. SSR, 1962. 127-130

TEXT: The behavior of a plasma pinch in an alternating magnetic field was measured for two types of magnetic fields, one producing a PIG discharge (constant field) and one producing total ionization and detachment of the plasma from the walls. The magnetic field was measured with probes and the density with an electric probe and also with a 4 mm microwave signal. The maximum density was found to be about 10^{15} per cc. In the case of the PIG discharge the density increases sharply toward the second or third maximum of the field, but in the case of no preliminary ionization the maximum occurs at the fourth or fifth maximum. The decrease in density and the breakup of the pinch with constant magnetic field are slowed down when the fields add and accelerate when the fields sub-

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tract. This is confirmed by streak photography. Sharp contraction of the plasma gives rise to radial osoillations of the pinch, which are more pronounced in argon than in hydrogen (because the frequency is higher). The slight increase in the magnetic field in the plasma close to the zero of the external field can be attributed to the fact that the plasma traps the magnetic field of the preceding cycle and the latter grows with compression of the plasma by the growing external field. The frequency of the plasma oscillation agrees roughly with the value obtained by Tuck (ref.4, cited in the Russian translation) for plasma in a straight-line discharge. There are four figures.

TOLOK, V.A.

Automation of the computation of arithmetical formulas by means of an electronic computer. Vop. vych. mat. i tekh. no.3:57-62 '64. (MIRA 18:9)

TOLOK, V.A.

Study of free vibrations of a thin cylindrical shell. Izv. AN Uz. SSR. Ser. tekh. nauk 8 no.5:25-28 '64. (MIRA 18:2)

ACCESSION NR: AP5001319 S/0167/64/000/005/0025/0028

AUTHOR: Tolok, V. A.

B

TITLE: A study of the free oscillation of thin cylindrical shells 26 26

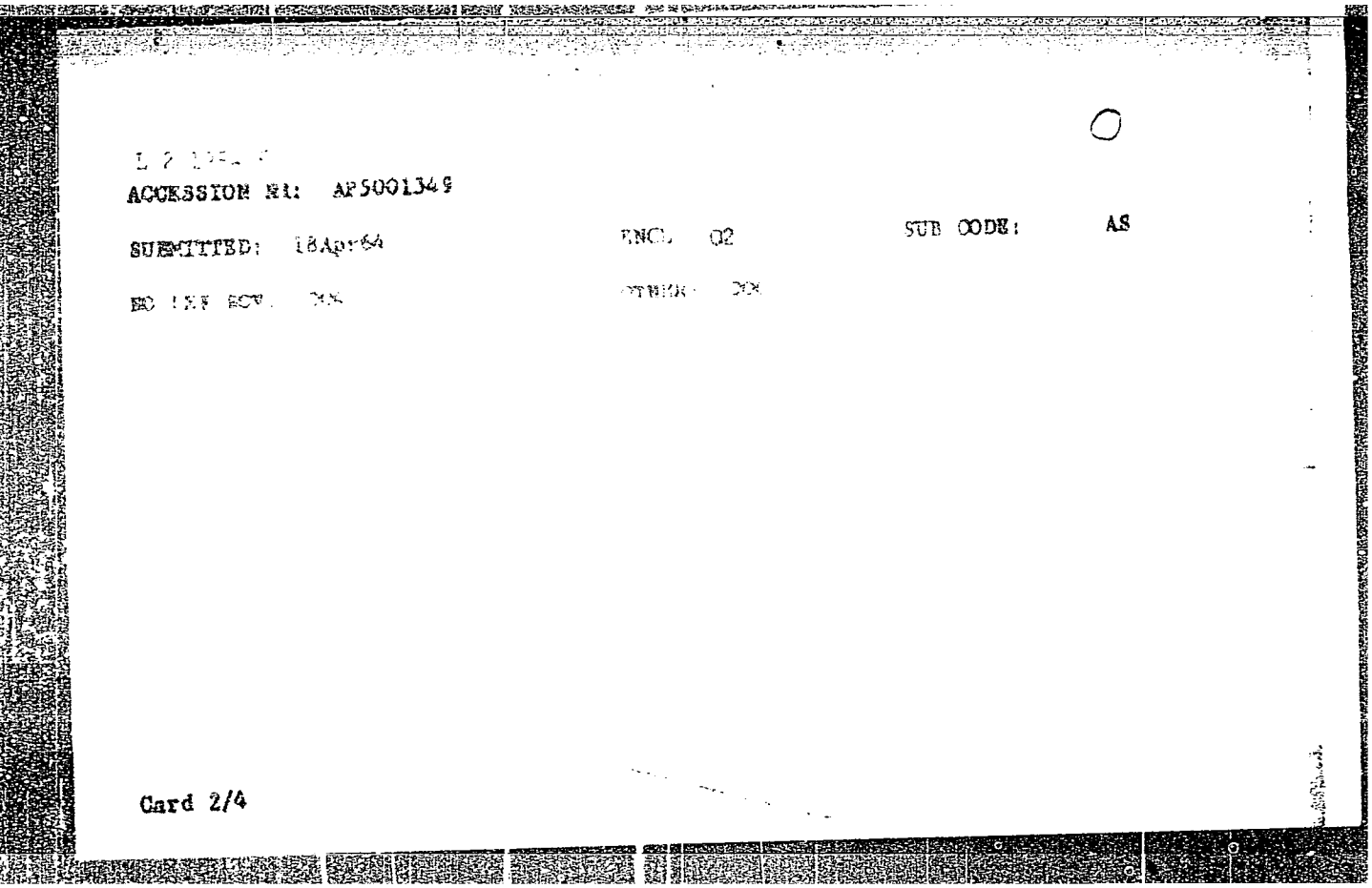
SOURCE: AN UzSSR. Izvestiya. Seriya tekhnicheskikh nauk, no. 5, 1964, 25-28

TOPIC TAGS: shell theory, cylindrical shell, edge effect, wave number, bending frequency

ABSTRACT: The author analyzes the frequencies of free oscillation of a closed cylindrical shell freely resting on its curved edges. The article is based on work by [illegible] V. Kabulov and U. D. Umiashvili. [illegible] that Umiashvili's formulas are good only for short shells when the edge effect prevails over the effect of tangential forces of inertia. The dependence of bending frequency on wave number m is plotted for [illegible] =0.5 and 1.0 (see Fig. [illegible] of the Enclosure). Orig. art. [illegible]

ASSOCIATION: [illegible] AN UzSSR Mechanics Institute, AN UzSSR); Vychislitel'nyy tsentr AN [illegible]

Card 1/4



L 2 [illegible]
ACCESSION NR: AP5001349

SUBMITTED: 18Apr64 ENCL 02 SUB CODE: AS

NO REF SOV: 000 OTHER: 000

Card 2/4

L 21[illegible]

ACCESSION NR: AP5001349

ENCLOSURE: 01

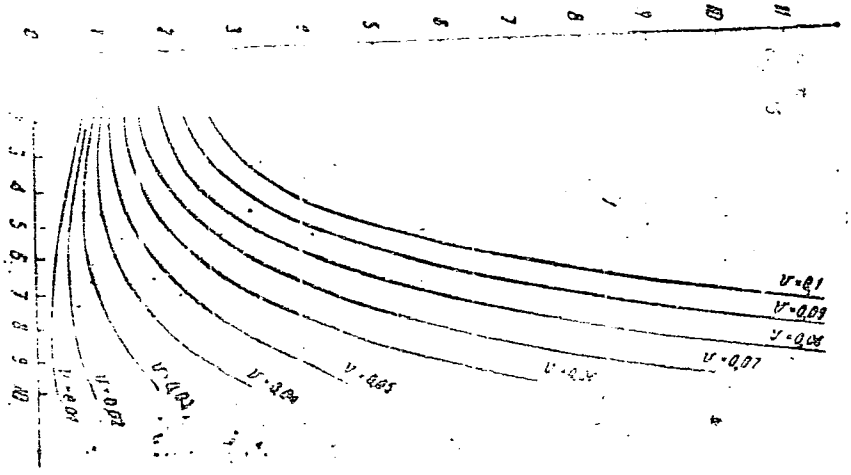


Figure 1. Dependence of bending frequency on wave number m. (Continued to Enclosure 02)

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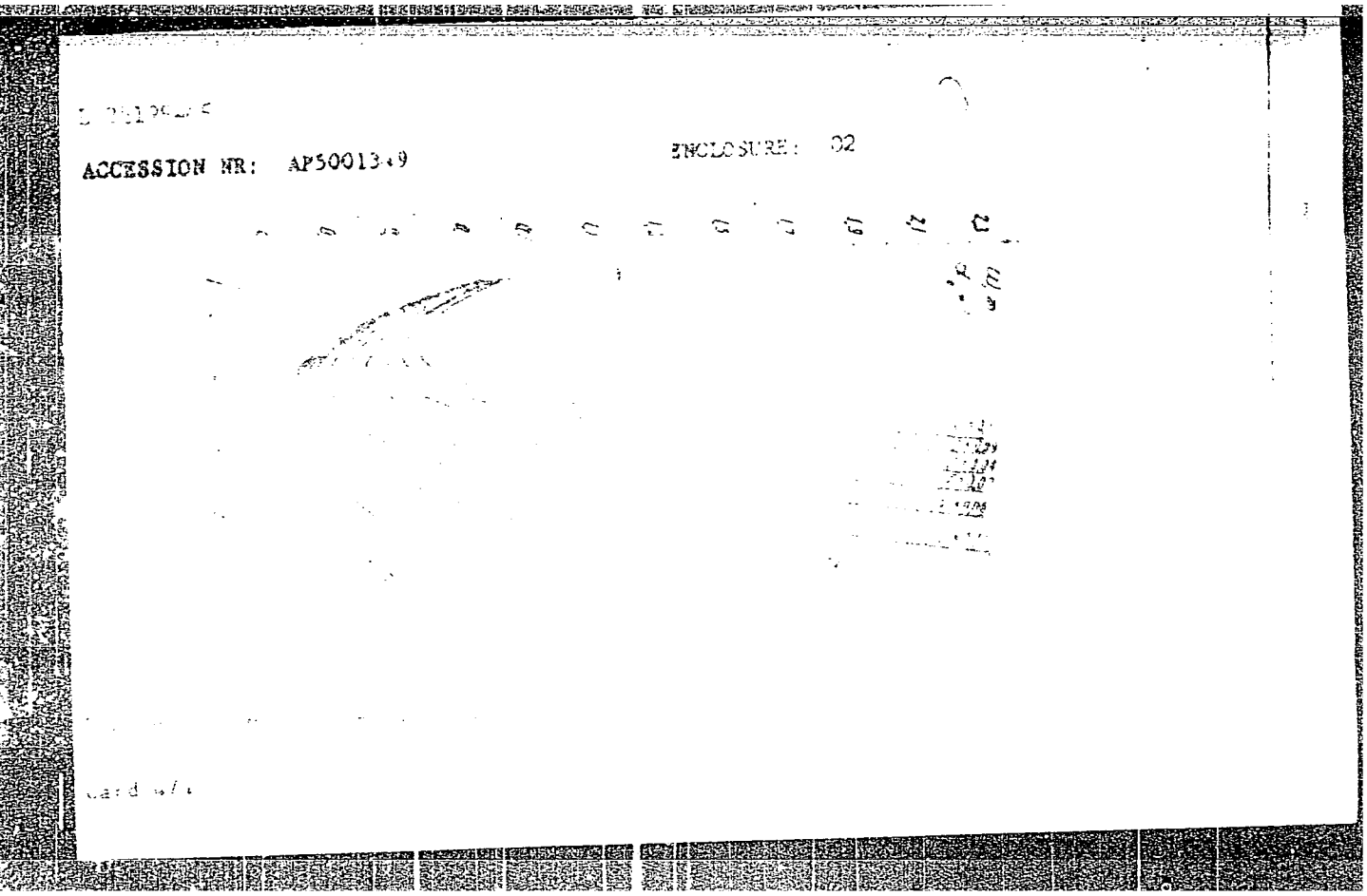

ACCESSION NR: AP5001349 ENCLOSURE: 02

Tolok, V.T.

9(314) PHASE I BOOK EXPLOITATION SOV/2746

Akademiya nauk USSR. Fiziko-tekhnicheskiy institut

Elektrostaticheskiye generatory; sbornik statey (Electrostatic Generators; Collection of Articles) Moscow, Atomizdat, 1959. 255 p. 4,100 copies printed.

Ed. (Title page): A. K. Val'ter, Member, Academy of Sciences, USSR; Ed. (Inside book): Z. D. Andreyenko; Tech. Ed.: N. A. Vlasova.

PURPOSE: This collection of articles may be useful to scientists and engineers working with high-voltage electrostatic generators.

COVERAGE: The authors discuss the construction and operation of a number of electrostatic generators developed in the USSR and describe methods of generating negative hydrogen ions. They discuss the operation of accelerating tubes and present methods of stabilizing accelerator voltages. No personalities are mentioned. References appear at the end of some articles.

Serbinov, A. N. High-frequency Sources for Electrostatic Generators 77
The author presents the results of study, conducted by FTI AN UkrSSR in 1955-1955, of factors affecting the ring discharge in hydrogen in a transverse magnetic field and those affecting the percentage of ions in a 10-50-mc frequency range and initial pressure in the discharge chamber of 1 through 4×10^{-4} mmHg. He also discusses the construction and operation of a high-frequency ion source. There are 3 references: 2 English and 1 German.

Belyayev, V. Kh., A. K. Val'ter, K. K. Chernyavskiy and S. P. Tsytko. High-voltage Vertical-Horizontal Electrostatic Generator 90
The authors discuss the construction and operation of an electrostatic generator with a cross-shaped steel boiler and two horizontal tubes and describe the advantages of such a design over horizontal and vertical types of generators. There are 25 references: 8 Soviet, 15 English, 1 French and 1 Danish.

Ostinskiy, G. M. Magnetic Analyzer as an Instrument for Measuring Voltages of an Electrostatic Generator 99
The author discusses the use of a magnetic analyzer for measuring voltages of an electrostatic generator. He briefly explains the construction of the analyzer and describes the procedure used in measurement. There are 3 references, all English.

Ostinskiy, G. M., and I. A. Chepurchenko. Voltage Stabilization of an Electrostatic Generator. 106
The authors discuss the construction and operation of a voltage stabilization circuit and its elements such as a differential amplifier and a corona triode and describe the method of experimentally determining the degree of stabilization. There are no references.

Fogel', Ya. M., A. M. Markus, V. T. Tolok and Ya. I. Shvarts. Ion Sources for Electrostatic Generators in a Compressed Gas 115
The authors discuss the requirements of ion sources for electrostatic generators and describe the construction of a magnetic ion source with a cold cathode and a high-frequency source. They also discuss the experimental study of these sources conducted by FTI AN UkrSSR and describe the experimental results. There are 29 references: 9 Soviet, 18 English and 2 German.

Fogel', Ya. M., L. I. Krupnik, A. G. Koval' and A. D. Timofeyev. Source of Negative Hydrogen Ions for an Overcharging Electrostatic Generator 141
The authors describe the construction and operation of three models of negative hydrogen-ion sources developed by FTI AN UkrSSR and present the analysis of their characteristics. The first and the second models were developed in 1955 and 1956 respectively. The third model, built later, is essentially a copy of that developed by Weinman, J. A., and Cameron, J. R., of the University of Wisconsin, U. S. A. In the analysis of characteristics of these models the authors discuss the negative ion spectrum, methods of determining the coefficient of transformation of positive ions into negative, focusing of ion beams, and loss of ion energy. There are 9 references: 3 Soviet, 4 English and 2 German.

Pivovar, L. I. Accelerating Tube of an Electrostatic Generator 183
The author briefly discusses factors affecting electric strength of an accelerating tube and describes processes taking place on tube walls and intermediate electrodes. He also explains the effect of residual gases and vapors in a tube on its operation. There are 11 references: 3 Soviet, 7 English and 1 French.

pz-6/po-4/pab-10/pi-4

Sinel'nikov, K.D.

fields

ABSTRACT The authors have investigated the confinement of plasma by a three-cusp
cylinder by four wind-
field at the wall of
at one or more
the periphery. The
and the magnetic
particular attention
the plane of the central
was given to the density and
cusp (Z_0 in the figure). It was found that when the plasma was injected only in the

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ACCESSION NR: AP5003238

central cusp the magnetic field did not tend to confine it to this region. The mag-
[illegible] region plasma that was in-
[illegible] was markedly increased
[illegible] was injected at both
[illegible] interaction
[illegible] from the two sides.
[illegible] plane when it was
[illegible] along the
[illegible] of time. In conclusion
[illegible] technical assistance with

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR, Khar'kov (Physicotechnical Institute, AN UkrSSR)

SUBMITTED: 13Jan64 ENCL: 01 SUB CODE: ME

NR REF SOV: 004 OTHER: 002

Card 2/3

L 27602-65

ACCESSION NR: AP5003238

ENCLOSURE: 01

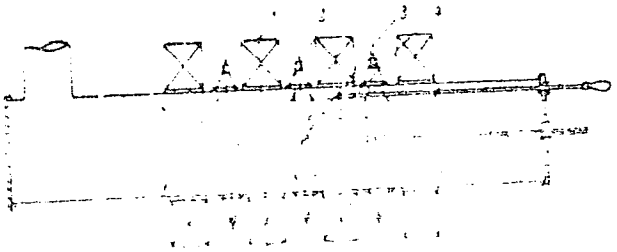

Diagram of the apparatus: 1 - wire nets, 2 - plasma guns, [illegible] probe.

Card 3/3

9.3150, 24.2120

77839
SOV/57-30-3-5/15

AUTHORS: Sinel'nikov, K. D., Tolok, V. T., Nazarov, N. I., Bakayev, I. I., Bondarev, V. A., Bugay, Yu. P.

TITLE: Investigations of Ion Cyclotron Resonance in a Dense Plasma

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 3, pp 283-288 (USSR)

ABSTRACT: The heating up of plasma under ion cyclotron resonance, where the ions acquire directly the energy of the electric field, is a process which one could hope to utilize for attaining high ionic temperatures. Theory developed by Stix (see ref) indicated that at plasma densities of 10^{14} cm^3 and more, one could generate and thermalize so-called ion cyclotron waves. The authors, therefore, investigated the ion cyclotron resonance in hydrogen plasmas of density 10^{12}-10^{14} cm^3 under impulse conditions, using a device described on Fig. 1.

Card 1/[illegible]

Investigations of Ion Cyclotron Resonance in a Dense Plasma

77839
SOV/57-30-3-5/15

Proc. Phys. Soc., 70, 446 B, 212, 1957; T. N. Stix, R. W. Palladino, Proc of 1958 Gen. Conf. A (15, p 360); T. N. Stix, Proc. of 1958 Gen. Conf. A (15, p 361).

ASSOCIATION: Physico-Technical Institute AS UkrSSR, Khar'kov (Fiziko-tekhnicheskiy institut AN USSR, Khar'kov)

SUBMITTED: October 22, 1959

~~Card 11/11~~

S/057/60/030/07/03/014
B019/B054 82244

10.2000(A)

AUTHORS: Zolototrubov, I. M., Ryzhov, N. M., Skoblik, I. P., Tolok, V. T.

TITLE: Behavior of a Plasma in a Magnetic Alternating Field

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 7, pp. 769 - 773

TEXT: In the present paper, the authors investigate the gas discharge without electrodes in a magnetic field of two single-turn coils fed by a capacitor battery. Fig. 1 shows the scheme of the experimental arrangement. It consists of a glass discharge tube with 100 mm diameter onto which the two copper windings are slipped. The capacitor battery has a capacity of 12.7 microfarad, and is charged to 30 kv. The maximum discharge current is 175 ka (with a central maximum magnetic field of 11 kilogauss). The oscillation period of the field is 13.5 microseconds. The photographs of discharges in Figs. 2a and 2b show that on amplification of the magnetic field the plasma gets loose from the walls, and contracts in a radial direction. Fig. 3a shows an oscillogram of the

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Behavior of a Plasma in a Magnetic Alternating Field

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B019/B054 82244

magnetic field measured with the measuring coil fixed outside to the glass tube, and Fig. 3b shows the axial magnetic field measured with a probe. Hence it appears that, on a reduction of the external magnetic field, the field in the interior of the plasma is reduced. If the external field becomes zero, the internal one is not zero and increases; its direction is opposite to that of the external one. In a brief theoretical deliberation it is shown that the product of the magnetic field intensity and the oscillation period is constant which also corresponds to the results of measurement (Table 1). A gamma emission with an intensity of 10^6 - 10^7 quanta with energies of up to 50 kev was observed in the discharges. The most intensive emission was found at a pressure of $5 \cdot 10^{-3}$ torr. The authors thank K. D. Sinel'nikov, Academician of the AS UkrSSR, for valuable hints in the conduction of investigation. There are 3 figures, 1 table, and 2 non-Soviet references.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Institute of Physics and Technology of the AS UkrSSR, Khar'kov)

SUBMITTED: November 30, 1959

Card 2/2

25375
S/089/61/011/001/004/010
B102/B214

24.6731 9.4230

AUTHORS: Khizhnyak, N. A., Tolok, V. T., Chechkin, V. V., Nazarov, N.I.

TITLE: The possibility of acceleration of large pulsed currents in electron linear-accelerators

PERIODICAL: Atomnaya energiya, v. 11, no. 1, 1961, 34 - 40

TEXT: This paper presents an evaluation of the suitability of different electron linear accelerators for accelerating intensive pulsed currents since their region of application is only incompletely known as yet. The theoretical studies published here are based essentially on the work carried out over many years at the Fiziko-tekhnicheskiy institut AN USSR (Institute of Physics and Technology AS UkrSSR), Kharkov. First, the acceleration of pulsed currents in electron traveling-wave linear-accelerators is discussed. The effect of the pulsed beam on a traveling - wave accelerator ($\pi/2$ wave, $\lambda \simeq 10$ cm) and a waveguide type accelerator is studied. The most important effects are three: 1) A change of electrodynamic acceleration conditions. For $v_o \simeq c$ the electron beam affects the electrodynamic properties very little, for $v_o < c$ much more. With a load of a

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The possibility of ...

current of ~1a the amount of change in the phase velocity of the wave is $\Delta\beta = 2.6\%$ ($\beta = 0.5$), 1.3% ($\beta = 0.7$), 025% ($\beta = 0.9$); ($\beta = v/c$). 2) Effect of the energy ratios in the accelerating system. There is a displacement of the synchronous phase toward the wave peak, i.e. toward the limit of the region of phase stability. It is possible to improve the energy ratios by increasing the injection energy of the electrons of enlarging the section with an alternating phase velocity of the wave. In sections with constant phase velocity (=c), the loading of the accelerator by the electron beam leads to a decrease of the electron energy at the output of the accelerator. For example, 12 Mw are required to obtain a pulsed current with 1a and 5 Mev having a width of the energy spectrum of 10%. 3) Effect of the dynamic conditions in traveling - wave accelerators. There is an upper limit of the current; for example, at an accelerating field of $E_z \simeq 100$ kv/cm this limit lies at 10 a. In the following the acceleration of pulsed currents in linear accelerators with standing waves is discussed in an analogous manner. An acceleration system is considered which consists of one or more connected endovibrators in standing - wave operation (π waves, $\lambda \simeq 2$m). In the decelerating phase, the beam is screened off from

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The possibility of ...

the field by drift tubes. For the acceleration of higher currents, this system has a number of advantages over the traveling-wave system, as there are: 1) Change of the electrodynamic conditions. When the condition $14.4 \cdot 10^{-6}(\lambda/R)^4 J < 1/Q_o + JW/Q_o D_o$ is satisfied, the change of the electrodynamic properties caused by the electron beam does not limit the accelerated current. (Q_o is the quality factor of the unloaded resonator, JW the h. f. power loss to the acceleration of the current of J amperes, D_o the h.f. power losses to the walls of the system, and R the radius of the endovibrator.) 2) Change of the electrical conditions of acceleration. There is a lowering of the pulse duration, and there is an optimal energy given by $W_{opt} = 1.44 \cdot 10^{-5} Q_o D_o$. The maximum charge that can be accelerated to W_{opt} is $Jt = 2 \cdot 10^{-4} \Delta E/E$ coulomb. This type of accelerator can accelerate much higher currents than the one mentioned before. Finally, the problem of particle dynamics in a standing wave accelerator is discussed. The longitudinal (phase) and transverse (radial) motions are separately discussed. The authors thank K. D. Sinel'nikov, and Ya. B. Faynberg for

25375
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B102/B214

The possibility of ...

discussions. A. I. Akhiyezer and N. P. Selivanov are mentioned. There are 2 figures.

SUBMITTED: July 10, 1960

Card 4/4

S/089/61/011/001/005/010
B102/B214

24,6731

AUTHORS: Tolok, V. T., Bolotin, L. I., Chechkin, V. V., Nazarov, N. I., Khizhnyak, N. A.

TITLE: A high-current electron accelerator

PERIODICAL: Atomnaya energiya, v. 11, no. 1, 1961, 41 - 45

TEXT: This paper presents a description of the 5-Mev electron linear-accelerator designed, built, and studied in 1955 at the Fiziko-tekhnicheskiy instutut AN USSR (Institute of Physics and Technology AS UkrSSR). The acceleration system consists of two coupled endovibrators excited to standing π waves with f = $137.4 \cdot 10^{-6}$ cps. The accelerator is fed by 12 autogenerators each of which delivers to the endovibrators up to 100 kw with a pulse duration of 400 μsec. Each resonator is a 16-faced prism, 1100 mm long, the diameter of the inscribed circle of the prisms being 1500 mm. The prisms are made of 1 mm thick copper strips secured to a solid body. The drift tubes (100 mm diameter) form accelerating gaps, each 600 mm long. The h.f. generators work in two cycles with self excitation. The 12 modulators deliver at the anodes of the generator-tubes voltage

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A high-current electron ...

pulses of up to 25 kv. The resonators are kept in a vacuum chamber maintained at a pressure of $(1-2)\cdot10^{-6}$ mm Hg by two diffusion pumps. The electron gun (with tungsten cathode in the form of a flat spiral) is placed inside the drift tube. A special modulator supplies the gun cathode with negative voltage pulses of up to 70 kv and durations of $0.2\cdot10^{-6}$ and $2\cdot10^{-6}$ sec. In normal operation the injection current is 6 a; on pulsed over-heating of the spiral it amounts to 40 a. The construction of the injector provides for the possibility of using an L - cathode. The phase difference of the π vibrations in the resonators is checked by an electron-beam phase meter, and the pulse height by a two-beam oscilloscope. The radial focusing of the beam at the output of the injector is accomplished by the radial component of the h.f. field. The elctron velocity at the output of the first acceleration gap is almost equal to the velocity of light and is not further affected by the radial component of the field. In the first gap there appears also a bunching effect which narrows the phase width of the beam from 2.2 to 1.6 radians, which value remains practically constant in the following gaps. At the exit of the accelerator the beam cross section is ~10 mm with an aureole of about 60 mm. It is focused on

A high-current electron ...

the target by means of two magnetic lenses; its diameter then becomes 3 mm. To study the possibility of obtaining the maximum current, the particle energy spectra were recorded at the output of the accelerator for different currents. The following results were obtained: A current of 8.5 a with a pulse duration of 0.2 μsec is obtained for an electron energy of 4.5 Mev. A current of 15 a with a pulse duration of 0.2 μsec and an electron energy of 3.8 Mev is yielded from the maximum of the charge that can be accelerated ($3 \cdot 10^{-6}$ coulomb). At this pulse duration a current of up to 25 a may be obtained, but the maximum electron energy is only 3 Mev and the energy spectrum is broader. To reduce this fall of energy and the consequent broadening of the spectrum it is necessary to increase the energy fed to the resonators. A further decrease of the electron energy for obtaining increased current is not convenient because for radial focusing the electron must have relativistic velocity in the first gap. The value of the time average of the current for this accelerator is up to 50 μa for 15 pulses/sec, which must be increased to 100-150 pulses/sec for increasing the average current. The authors thank K. D. Sinel'nikov, P. M. Zeydlits, and Ya. B. Faynberg for discussions. V. I. Veksler and V. V. Vladimirskiy are mentioned.

Card 3/4

25376
S/089/61/011/001/005/010
B102/B214

A high-current electron ...

There are 5 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: M. Kelliher, J. Nugard, A. Gale. IRE Trans. Nucl. Sci., No. 3, 1 (1956).

SUBMITTED: July 26, 1960

Legend to Fig.1: 1) generator, 2) resonator, 3) electron gun, 4) connecting opening.

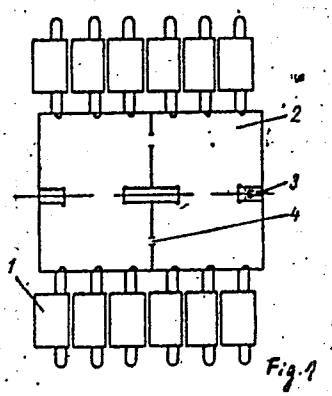

Fig.1

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89100

S/057/61/031/002/014/015
B124/B202

26.2311

AUTHORS: Nazarov, N. I., Yermakov, A. I., Tolok, V. T., and Sinel'nikov, K. D.

TITLE: Propagation of ion cyclotron waves in a plasma

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 2, 1961, 254-255

TEXT: The experiments were made by means of a device similar to that described in Ref. 1. Gas discharge took place in a 1.6 m long glass tube with a diameter of 60 mm, in an axially magnetic field with a field intensity of up to 15 kilooersteds. The magnetic field attained its maximum value within 10^{-2} sec, it dropped by 2.7 times within $8 \cdot 10^{-2}$ sec. Hydrogen in the pressure range from 10^{-4} to 10^{-2} mm Hg served as working gas. The high-frequency energy was fed into the plasma by means of an induction coil usually used in cyclotron heating. It consisted of six parts connected in phase opposition. The axial periodicity of the h.f. magnetic field in the coil was 16 cm. The load current circuit consisting of this coil and vacuum condensers had the quality factor 310. The current circuit

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Propagation of ion cyclotron...

was fed by an h.f. generator with quartz stabilization and a power of 80 kw. The duration of pulses varied between 10^{-5} and 10^{-2} sec, the working frequency of the generator varied from 3 to 30 Mcps. The absorption of the h.f. power by the plasma in the region of ion-cyclotron resonance was determined by measuring the voltage in the current circuit as well as from the change of the electron density during discharge, and from the intensity of the hydrogen spectral line H_β. With given parameters of the h.f. current circuit about 5 kw were introduced into the plasma in the region of ion-cyclotron resonance. Owing to the resulting high degree of ionization of the gas no plasma formation by direct electrode discharge was necessary. In this case, experiments could be made also at low hydrogen pressures (up to $2 \cdot 10^{-4}$ mm Hg). The upper curve in Fig. 1 shows the change of load of the h.f. current circuit in the region of ion-cyclotron resonance, the lower curve shows the intensity of the H_β line. The duration of pulses of the h.f. generator is about 3 msec. After 0.5 msec hydrogen is intensively ionized. The upper curve of Fig. 2 shows a curve analogous to that in Table 1, the lower one shows the curve of the amplitude change of the h.f. (wave) signal at the electrode. The signal occurred only when the h.f. current circuit was loaded in the region of

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Propagation of ion cyclotron...

ion-cyclotron waves. Both figures show that the amplitude of the wave signal at the probe mainly depends on the degree of plasma ionization. The results obtained prove the penetration of h.f. energy into the plasma in the form of ion-cyclotron waves. The mentioned data also prove the results of the experiments of T. Stiks et al. in the stellarators B-65 (V-65) and B-66 (V-66) (Refs. 2, 3). Besides, also waves shorter than the cyclotron waves were observed in the magnetic fields. The working pressure in this case was 10^{-3} mm Hg. Under the experimental conditions of the authors such waves were observed only at pressures exceeding $8 \cdot 10^{-3}$ mm Hg. Their occurrence has hitherto not been explained. There are 2 figures and 3 Soviet-bloc references.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR, Khar'kov (Institute of Physics and Technology of the AS UkrSSR, Khar'kov)

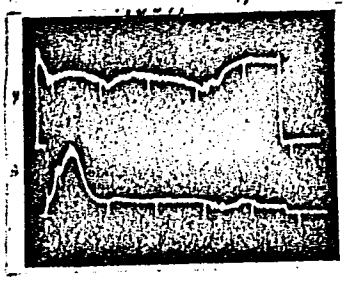
SUBMITTED: September 10, 1960

Card 3/4

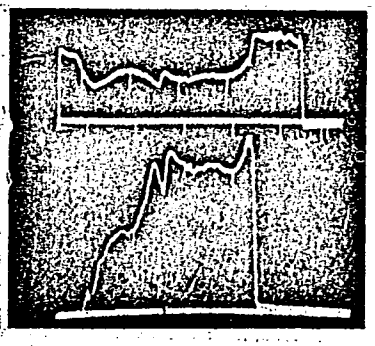
89168

Propagation of ion cyclotron...

Legend to Fig. 1: Voltage in the current circuit and intensity of the H_β line in the region of ion-cyclotron resonance. Hydrogen pressure $1 \cdot 10^{-3}$ mm Hg, generator frequency 10.8 Mc/sec.



Legend to Fig. 2: voltage in the current circuit and h.f. signal of the probe.



Card 4/4

89169

S/057/61/031/002/015/015
B124/B202

26.2321

AUTHORS: Volkov, Ya. F., Tolok, V. T., and Sinel'nikov, K. D.

TITLE: Study of the electrodeless discharge in a magnetic trap with additional azimuthal magnetic field

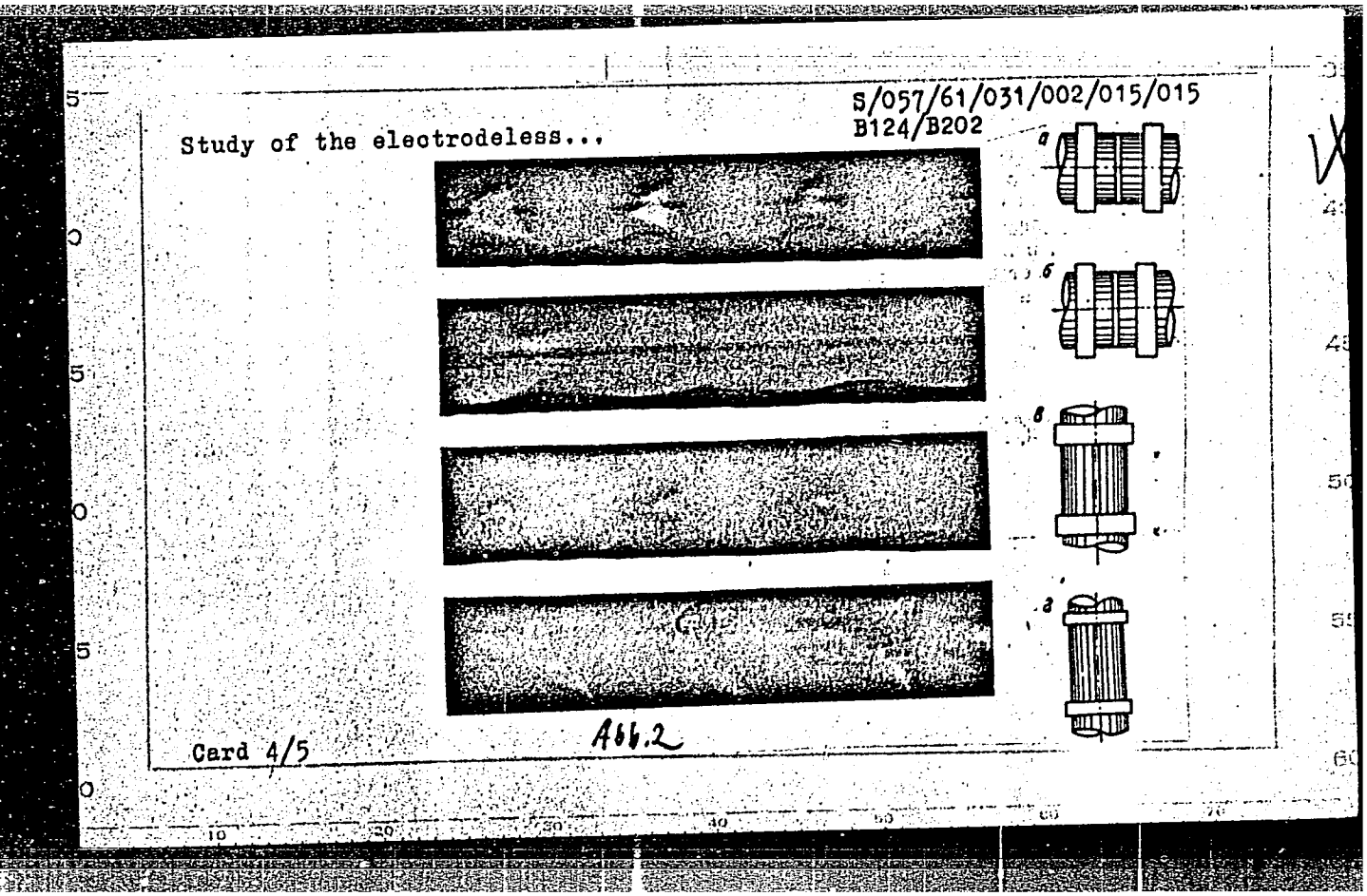
PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 2, 1961, 255-258

TEXT: The plasma can be heated by a fast magnetic trap. In such a system, the diameter of the plasma cylinder is shortened during compression, which leads to a looser connection between coil and plasma in experiments of plasma heating by means of ion-cyclotron resonance. The presence of an initial magnetic field H_φ may prevent a strong shortening of the radius of the plasma cylinder without changing the degree of compression. Experiments were made with the field H_φ to obtain a hollow plasma cylinder and to explain the interaction between the plasma and such a system of magnetic fields. The authors also studied gamma radiation which almost always accompanies such discharges. The discharge of two condenser batteries caused the formation of a three-phase field with the voltage $E_{\varphi 1}$ = 30 v/cm, $E_{\varphi 2}$ = 3v/cm with a period of 20 and 270 msec, respectively, with an axial

magnetic field intensity $H_z = 5$ koe and a mirror ratio of 2:1. A further condenser battery was discharged above a rod which lies in the axis of the system thus producing a field $H\varphi$; discharge current I = 20 ka. Fig. 2,a,b,v, g shows the "SFR-graphs" in argon, which indicate that $H\varphi$ causes no plasma compression; the plasma exists in the form of two coaxial cylinders one of them bordering the rod (Fig. 2,a,b). The drift along the axis Z (Fig. 2, v,g) is caused by the force acting upon the ions as a result of their motion relative to the axis in the field $H\varphi$. With changed sign of $H\varphi$ also the direction of drift is reversed. The same holds for the hydrogen plasma. X-radiation was studied under the following conditions: 1) Anti-parallel connection of coils without occurrence of gamma radiation; 2) parallel connection of coils in the presence of $H\varphi$; under these conditions gamma radiation had an energy of about 50 kev and a mean intensity of 20 mr/discharge. Gamma radiation was observed in argon in the pressure range $p = 5 \cdot 10^{-4} - 5 \cdot 10^{-3}$ mm Hg and in hydrogen at $p = 2 \cdot 10^{-3} - 3 \cdot 10^{-2}$ mm Hg. Fig. 3,a,b shows the oscillograms of the magnetic field, the shf signal ($\lambda = 4$ mm), and of gamma radiation. By means of a lead collimator the author shows that radiation in the region

of the minimum of the magnetic field occurs between the mirrors. With $E_{\varphi 2}$ = 3 v/cm no gamma radiation occurs independently of the other conditions; 3) parallel connection of the coils in the presence of H_φ. The presence of H_φ changes the character of gamma radiation; the energy increases up to about 100 kev; the pressure region in which gamma radiation is formed is shifted to the high-vacuum by one order of magnitude; with increasing H_φ gamma radiation occurs every half period beginning with the formation of the plasma. The intensity of gamma radiation increases and amounts to approximately 2.5 r/discharge. The photography of discharge in X-rays shows that the emission from the rod has its origin in the region between the mirrors. The glass tube which is inserted parallel to the rod at a distance of 1 cm reduces radiation intensity by 7-10 times. Fig. 3,v shows the oscillograms of radiation and the field H_z in the presence of H_φ. There are 2 figures and 1 Soviet-bloc reference.

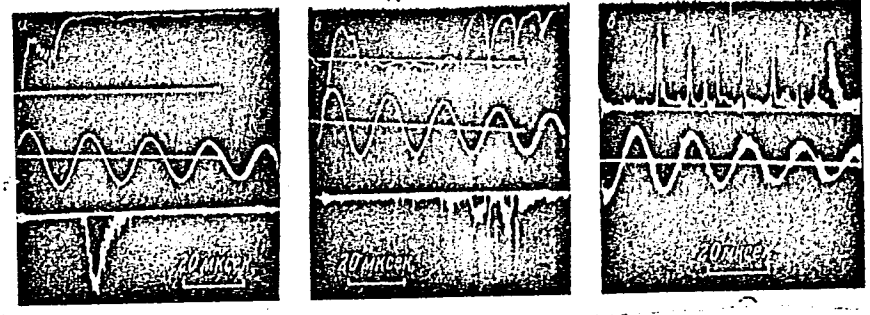
SUBMITTED: September 10, 1960



Study of the electrodeless...

Legend to Fig. 3: a - in the absence of the field H_φ, p = $1.5 \cdot 10^{-2}$ mm Hg b - in the absence of field H_φ, p = $3 \cdot 10^{-3}$ mm Hg (upper oscillograms - passage of the shf signal through the plasma, mean magnetic field H_z, lower-gamma radiation); v - in the presence of the field H_φ (upper oscillogram - gamma radiation, lower oscillogram - field H_z) 20 μsec.

Abb. 3



Card 5/5

22771

S/057/61/031/005/002/020
B104/B205

34.2122(1043,1141)
26.2321

AUTHORS: Zolototrubov, I. M., Novikov, Yu. M., Ryzhov, N. M., Skoblik, I. P., and Tolok, V. T.

TITLE: Magnetic compression of plasma

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 5, 1961, 518-521

TEXT: The heating of plasma by magnetic fields slowly varying in time is discussed in the introduction. It is shown that, if the variation is slow with respect to the Larmor period, the final energy of the particles will be determined only by their initial energy and by the ratio of field strengths at the beginning and at the end of the cycle of compressions. As the holding time is very short for small initial energies, compression must be done quickly. This can be achieved either by the use of strong and rapidly varying magnetic fields which ionize the gas through the induced eddy emf and compress the resulting plasma, or by means of two magnetic fields, one rapidly varying and heating the gas and the other slowly varying and compressing the plasma. The second method is more convenient for practical purposes. The authors dwell upon several papers

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Magnetic compression of plasma

Including those by A. C. Colb (Phys. Rev., 112, 291, 1956), Colb et al. (Phys. Rev. Letters, 1, 5, (1959)) and Boyer et al. (Phys. Rev. 119, 831, 1960). Experiments with both kinds of plasma heating have shown that neutrons and soft X-rays are emitted as soon as maximum compression is attained, which is indicative of plasma heating. Colb's statement that the plasma is stable was refuted by I. F. Kvartskhava et al. (ZhETF, 38, 1641, 1960; ZhTF, XXX, 11, 1321, 1960). Here, an experiment is described, in which compression was effected by a slowly varying magnetic field. The experimental arrangement does not differ essentially from that used by Colb and others. The only difference is that the preliminary ionization was brought about by a shock wave produced by an induction discharge without electrodes (Fig. 1). The shock wave was produced by coil 1 (one winding) over which a capacitance of 6.3 μf charged up to 30 kv was discharged. The discharge took 6 μsec. The maximum magnetic field had a strength of 60 koe. The principal magnetic field was generated by coil 2 which consisted of 15 windings and generated a field of 85 koe. A camera was installed in the middle of this coil, between the windings. As the capacitance of the coil was much higher than that of the discharge circuit, the energy of the capacitor could be utilized up to 95%.

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Magnetic compression of plasma

Discharge tube 3 was made of quartz and had an inner diameter of 3 cm and a length of 1 m. During the experiment the pressure could be measured within the range of $10^{-1} - 5 \cdot 10^{-2}$ mm Hg. A photograph [Abstracter's note: Not reproducible] shows that the velocity of the shock wave in the first semi-period was not especially high but increased with increasing discharge. In the part of the shock wave where the gas was ionized by the preceding shock wave, its velocity was 5-6 times higher than in the part where the gas was not ionized. As the amplitude of the magnetic field diminished, the velocity of the shock wave tended toward a limit, i.e., the velocity of sound. Fig. 3 shows oscillograms of the magnetic field (a) and of the intensity of X-ray emission (б) and (в). The first pulse in 3б appeared in the second semiperiod of the principal magnetic field. 3в shows X-ray emission with a very long delay time. The optimum delay time was attained when the principal field was switched on after the sixth semiperiod. In this state, the velocity of waves produced by coil 1 was constant. It may be seen that the compression of the plasma by the principal field leads to instabilities accompanied by X-ray emission. A photographic film was used to study the regions of X-ray emission. The blackenings had a local character and were unevenly distributed between the middle of the coil and

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that end which was opposite to coil 1. K. D. Sinel'nikov, Member of the AS UkrSSR, is thanked for a discussion. There are 4 figures and 10 references: 7 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Institute of Physics and Technology, AS UkrSSR, Khar'kov)

SUBMITTED: July 15, 1960

Fig. 1

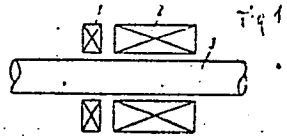
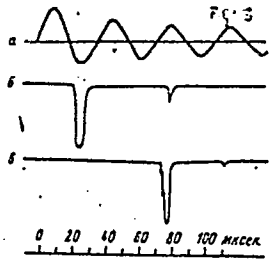


Fig. 3



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34217
S/057/62/032/002/019/022
B124/B102

24.6730

AUTHORS: Tolok, V. T., and Sinel'nikov, K. D.

TITLE: A feasible method for plasma injection into closed magnetic traps

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 2, 1962, 248 - 249

TEXT: The injection of plasma into a stellarator system is performed in two steps, i. e., introduction (Fig. 1) and forcing through (Fig. 2). Single-turn coil 1 induces an alternating magnetic field $H_{\sim}$ which, if directed opposite to the basic field H_0, leads to the formation of a system of opposed magnetic fields having two annular slits in the basic retarding magnetic field. In order to eliminate the action of turn 1 on coil 2, which produce the basic field H_0, the latter are equipped with metallic shields. Plasma injection is performed through the annular slits. When the sign of $H_{\sim}$ is changed, the slits disappear, and magnetic pressure on the plasma is increased to $\leqslant \frac{(H_0 + H_{\sim})^2}{8\pi}$, whereby the plasma is forced through

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A feasible method for ...

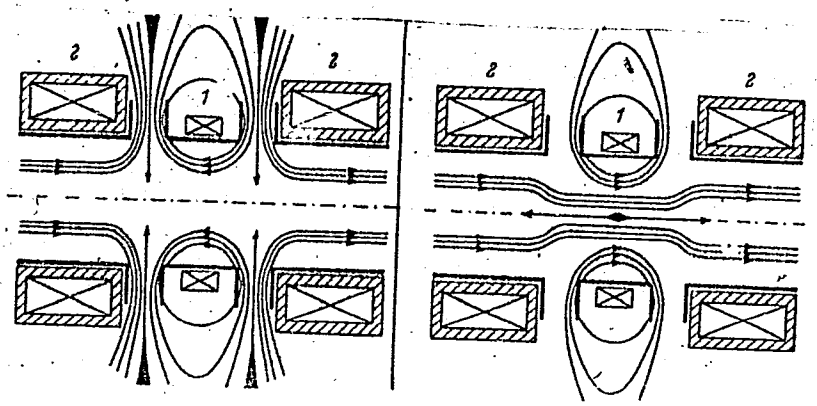
alonggn the axis of the systems. The authors thank V. F. Aleksin, V. G. Zykov, and I. M. Zolototrubov for discussion. There are 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR, Khar'kov (Physicotechnical Institute, AS UkrSSR, Khar'kov)

SUBMITTED: August 10, 1961

Fig. 1.

Fig. 2.



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2

TOLOK, V.T.

37256
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B102/B104

24.6714 (3423)
24.6740

AUTHORS: Nazarov, N. I., Yermakov, A. I., Lobko, A. S., Bondarev, V. A., Tolok, V. T., and Sinel'nikov, K. D.

TITLE: Examination of ionic cyclotron waves

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 5, 1962, 536-540

TEXT: The authors continued previous experiments (ZhTF, 31, 254, 1961) on the excitation and propagation of ionic cyclotron waves. In an apparatus schematically shown in Fig. 1, a powerful h-f discharge in hydrogen and deuterium was studied in a range near ionic cyclotron resonance, and the conditions of forced resonance excitation of ionic cyclotron waves and of their propagation along the magnetic field were determined. Polarization and attenuation of these waves was also measured. The discharge took place in a tube of molybdenum glass (2 m long, 60 mm thick) arranged in a solenoid which created a quasi-constant magnetic field. The arrangement was such that two field regions were present: one for resonance excitation and another for the damping of the ionic cyclotron waves. The overall length of the coil was

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Examination of ionic cyclotron waves

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1.5 m. The field was created by discharging a capacitor bank with a total capacity of $2.25 \cdot 10^{-2}$ f, which could be charged up to 5 kv. The field reached 20-25 kilogauss within 5 msec. The exciting electromagnetic field had a wavelength of 16 cm. The resonance circuit had a quality factor of 400 with an 80-kw generator (3-30 Mc/sec), and the maximum voltage in the circuit was 30 kv. Hydrogen of 10^{-2}-10^{-4} mm Hg was blown through the evacuated (1.10^{-6} mm Hg) discharge tube, and after a long-time aging of the system with h-f discharges, voltage and probe-signal oscillograms were recorded. At the moment of resonance load, the generated wave starts traveling along the constant magnetic field. Its magnetic-field distribution and phase variation along the field were measured (Figs. 5, 6). The wave was found to be circularly polarized; the polarization vector rotated in the same sense as did the free ion in the magnetic field. The damping process was studied with waves traveling in a region of magnetic fields equal to that of the cyclotron waves. Damping was found to set in only at a certain distance with various field geometries, which cannot be attributed to collision damping only. At $H \simeq H_{cyclotron}$, cyclotron damping becomes more effective. There are

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Examination of ionic cyclotron waves

8 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR (Physicotechnical Institute AS UkrSSR) Khar'kov

SUBMITTED: June 3, 1961

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38929
S/057/62/032/007/003/013
B104/B102

AUTHORS: Volkov, Ya. F., Tolok, V. T., and Sinel'nikov, K. D.

TITLE: γ-emission from a discharge in a magnetic trap with additional azimuthal magnetic field

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 7, 1962, 811-816

TEXT: In this continuation of an earlier paper (Ya. F. Volkov et al., ZhTF, XXXI, 255, 1961) the γ-emission is studied as a function of the discharge parameters, the locus and the mechanism of the electron acceleration is clarified, and the role of the azimuthal magnetic field is also examined. An electrodeless discharge was produced in argon gas flowing through a spherical molybdenum glass flask (Fig. 1). The azimuthal magnetic field was generated by the central current-carrying Cu bar. One of the tantalum targets could be radially shifted in the equatorial plane. These were used to determine the electron acceleration orbits. The γ-emission generated by the deceleration of fast electrons in the plasma was measured by an ФЭУ-29 (FEU-29) photomultiplier with NaI crystal, the magnetic field by means of probes. The azimuthal field

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increased the intensity of the γ-emission fourfold, the energy between threefold and fourfold. The azimuthal field prevents a contraction of the hollow plasma filament toward the copper bar. There are 7 figures.

SUBMITTED: August 10, 1961

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41565

S/057/62/032/010/003/010
B104/B102

26.2371

AUTHORS: Zykov, V. G., Il'yenko, B. P., Lats'ko, Ye. M., Stepanenko, I. A., Ternopol, A. M., Tolok, V. T., and Sinel'nikov, K. D.

TITLE: Investigation into the properties of magnetic surfaces in systems with a helical magnetic field

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 10, 1962, 1190-1196

TEXT: The shapes of the magnetic surfaces in systems with stabilizing helical windings were studied by the method of the preceding electron beam, developed by F. V. Karmanov and P. A. Cheremnykh at the Institut atomnoy energii im. I. V. Kurchatova (Institute of Atomic Energy imeni I. V. Kurchatov) and by injecting plasma clouds into a right cylinder with a three-turn coil, or by injecting them into the curvilinear section of a stellarator model. In the experiments with the preceding electron beam a fluorescent screen was used in the right cylinder (Fig. 1); in the experiments with the plasma clouds special targets were used, superficially charged by the plasma particles. If no current flows in the helical windings, the electron beam forms concentric circles on the fluorescent

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screen. As the amperage in the helical winding increases, the circles degenerate to triangles, whose sides later bend inward. The largest and smallest radii of the separatrices measured as functions of I_{hel}/H_z, and the distortions of the magnetic surfaces caused by deviations of the magnetic axis from the geometric axis, are in agreement with theoretical results. The cross sections of the plasma clouds were studied as functions of I_{hel}/H_z in clouds completely filling the cross section of the tube, and in clouds partially screened by diaphragms. In the former case two types of particles were distinguished, one type remaining trapped in the central part of the cloud bounded by a separatrix, the other escaping from the confinement region. In the second case all plasma particles remained in the confinement region if the radius of the separatrix exceeded that of the clouds, but if it was smaller the same result was obtained as in the first case. The separatrix is a function of the confining induction and of the amperage in the helical windings. This agrees with the theory. The magnetic surfaces in the curvilinear chamber of a stellarator model was studied by the same methods, yielding practically the same results with the electron beam as those obtained with the right cylinder. It is only in the

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initial stage of the discharge that the electrons escape to the copper-walls of the vacuum chamber (diameter 80 mm) which was shaped as a semi-tore (mean radius of curvature 42 cm). It is concluded that at low velocities and small densities the plasma particles move along the lines of the magnetic field. There are 8 figures.

SUBMITTED: November 29, 1961

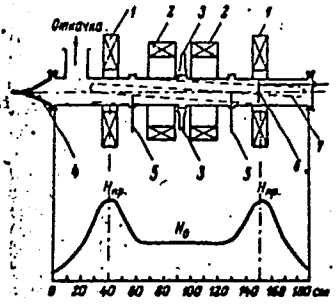

Fig. 1. Experimental arrangement (right cylinder).
Legend: (1) coils producing the magnetic mi mirror field; (2) coils producing the main field; (3) mouthpiece for 3-cm waves; (4) conic plasma gun; (5) electric probes; (6) fluorescent screen; (7) helical winding.

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S/781/62/000/000/001/036

AUTHOR: Sinel'nikov, K. D., Tolok, V. T., Nazarov, N. I., Bukayev, I. I., Bondarev, V. A., Bugay, Yu. P., Loginov, A. S., Kononenko, V. I.

TITLE: Investigation of ion cyclotron resonance in a dense plasma

PERIODICAL: Fizika plazmy i problemy upravlyayemogo termoyadernogo sinteza; doklady I konferentsii po fizike plazmy i probleme upravlyayemykh termoyadernykh reaktsiy. Fiz.-tekh. inst. AN Ukr. SSR. Kiev, Izd-vo AN Ukr. SSR, 1962, 3-8

TEXT: Ion cyclotron resonance heating of plasma, whereby field energy is transferred to the ions directly, is a promising method of rapidly attaining high ion temperatures. The article describes investigations of ion cyclotron resonance in a plasma produced by direct discharge in a glass tube 60 cm long and 6 cm in diameter. The discharge was produced by a rectangular voltage pulse of duration up to 800 microseconds and current up to 500 amp. The discharge tube was placed in a magnetic field produced by a solenoid fed from a capacitor bank with maximum stored energy 40,000 J, charged to 5 kV. The time required for the

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magnetic field to reach maximum was 4.7×10^{-3} sec.

The experiments have shown that there exist optimum values of hydrogen pressure and discharge current for the absorption of high frequency power by the plasma. The half-width of the resonant curves increases monotonically with increasing gas pressure, indicating that the accelerating ion interacts strongly with the neutral atoms. An increase in the discharge current and consequently in the ion density in the discharge also shifts the resonant peak toward magnetic field values below the resonant field. Density measurements in the hydrogen plasma have shown that at 300 amp a plasma of $6 \times 10^{13} cm^{-3}$ density has a lifetime of 150 microseconds after the termination of the discharge. It is also noted that the resonant peak becomes asymmetrical with increasing plasma density, this being possibly due to the diversion of part of the high frequency power to the generation of ion cyclotron waves. It is also likely that at densities above optimal the screening of the plasma against the high frequency field comes into play.

There are eight figures and five references. The English language references are: K. S. W. Champion, Proc. Phys. Soc. 70, 446, B, 212 (1957), and translated articles by T. N. Stix and R. W. Palladino.

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